



Cross-cultural adaptation of the spinal cord lesion-related coping strategies questionnaire for use in Iran



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ABSTRACT

Introduction: This study examined the validity and reliability of the Iranian version of the spinal cord lesion-related coping strategies questionnaire (SCL CSQ-I) in persons with spinal cord injury (SCI).

Methods: Consecutive patients with SCI ($n = 220$) were recruited into the study. A standard forward-backward translation procedure was used to translate the SCL CSQ from English into Persian. Participants also completed the Short Form Health Survey (SF-12), Hospital Anxiety and Depression Scale (HADS), Spinal Cord Independence Measure (SCIM III), Community Integration Questionnaire (CIQ), and SCL CSQ-I. Psychometric properties examined were internal consistency, test-retest reliability, convergent validity, discriminant validity, and construct validity.

Results: Cronbach alphas for the SCL CSQ-I subscales ranged from 0.68 to 0.89, indicating acceptable internal reliability, and intraclass correlation coefficients ranged from 0.74 to 0.89, indicating good test-retest reliability. The SCL CSQ-I subscales significantly correlated with scores on the SF-12, HADS, SCIM III and CIQ, indicating solid convergent validity. Each item of the SCL CSQ-I within a hypothesized dimension correlated strongly with the total score for that dimension. Exploratory and confirmatory factor analyses identified a three-factor model. The SCL CSQ-I subscales correlated significantly with clinical and socio-demographic characteristics.

Conclusion: The Iranian version of the SCL CSQ is a reliable and valid tool for measuring coping strategies in persons with SCI.

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Introduction

Spinal cord injury (SCI) is a common cause of disability and death in the world. It is estimated that the annual incidence of the SCI is 2.1–57.8 cases per million [1]. SCI has been associated with dependency on caregivers, elevated levels of anxiety and depression, and lower quality of life. Persons with SCI are more

prone to suicide than the general population [2]. These individuals are especially likely to have adjustment problems immediately after the injury when their lives are rapidly changing from being independent to dependent. Coping strategies have been identified as serving an important role in patients' adaptation to stressful events [3]. Despite the existence of several scales to assess coping strategies, such as the COPE Inventory [4] and Multidimensional Coping Inventory [5], there is only one scale that assesses coping specific to spinal cord injuries. Moreover, these commonly used measures are lengthy and difficult to complete. The spinal cord lesion-related coping strategies questionnaire (SCL CSQ) is a disease-specific tool that was developed by Elfstrom et al. to assess coping strategies in

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persons with SCI [6]. SCL CSQ has been translated into several languages including Turkish and Spanish [7,8]. The psychometric properties of the SCL CSQ have been established in these contexts and found to be solid.

Coping and adjustment to any condition is related to the context and problems characteristic to the condition. Therefore, it is necessary to evaluate coping strategies specific to the conditions to which persons are exposed. Although, general coping scales may produce useful information about coping, developing and applying measures specific to a condition may provide unique information regarding the problems and issues that may arise. This information may provide a better understanding of how coping affects adjustment in a particular study population [9]. Therefore, the aim of the present study was to explore the validity and reliability of the Iranian version of the SCL CSQ in persons with SCI.

Materials and methods

Participants

From January to July of 2014, we approached 233 persons with SCI referred to the neurology centre of Qazvin University of Medical Sciences. The inclusion criteria were having SCI for more than 3 months, speaking Persian/Farsi languages, and agreeing to participate in the study. Those with cognitive impairment, concomitant brain injury, or difficulties communicating were excluded from the study. A total of 13 persons (5.6%) declined to participate. All participants provided written informed consent. Permission for the use of all measures was obtained from the developers of these tools. This study was approved by the research Ethics committee of Qazvin University of Medical Sciences (QUMS).

Measures

Socio-demographic and clinical characteristics were collected from participants' medical records.

Spinal cord independence measure (SCIM III)

Ability to perform daily living activities was assessed by the SCIM, which is comprised of 19 items that include three subscales involving self-care (feeding, bathing, dressing, grooming), mobility (transferring in and out of bed, indoor/outdoor activities), and respiration and sphincter management. The total score of the SCIM ranges from 0 to 100, with higher scores indicating greater independence. Among the three versions of the SCIM, the third version has been found to be the most reliable and valid in persons with SCI [10].

Hospital anxiety and depression scale (HADS)

The HADS is a brief (14-item) self-report measure used to assess anxiety and depression among medical patients. The HADS is composed of two subscales including anxiety (7 items) and depression (7 items). Each item is scored on a Likert-type scale ranging from 0 to 3 with higher scores indicating greater anxiety and depression. The psychometric properties of the Iranian version of the HADS have been established for patients with medical illness [11]. This scale has been used previously in persons with SCI and has been shown to be valid and reliable [12,13].

Short form health survey (SF-12)

The SF-12 is a well known measure used to assess general health-related quality of life. Responses are transformed into a 0–100 scale with higher scores indicating higher quality of life.

The 12 items are presented in two summary scores involving physical and mental components (PCS-12 and MCS-12). The SF-12 has been

translated into Persian/Farsi and its reliability and validity established in a sample of 144 patients undergoing hemodialysis [14]. The SF-12 has been used in many studies among those with SCI and has good psychometric properties in this population [15].

Community integration questionnaire (CIQ)

The CIQ is a 15-item scale that assesses community integration. Each item is scored on 3-point Likert scale ranging from 0 to 2, with an overall score ranging from 0 to 29 with higher scores indicating greater integration. The Persian version of the CIQ has been reported to be reliable and valid in Iranian patients [16]. Gontkovsky et al. and Kratz et al. have used the CIQ to assess community integration among persons with SCI and found it to be a valid and reliable measure [17,18].

Spinal cord lesion-related coping strategies questionnaire (SCL CSQ)

The SCL CSQ was developed to assess coping strategies in persons with SCI. This brief 12-item scale covers three domains including Acceptance (5 items), Fighting Spirit (4 items), and Social Reliance (3 items). Responses are scored on a 4-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree). The mean of all items is used to calculate domain score, and ranges for each domain from 0 to 4 with higher scores indicating higher agreement [19].

Translation procedure

The revised English version of the SCL CSQ v1.0 was used in the translation [19]. The translation procedure followed Beaton's recommendations [20]. First, two bilingual translators with medical backgrounds translated the SCL CSQ into Persian/Farsi independently (forward translation). Second, the translators of the scale and the project manager synthesized the results and resolved discrepancies between the translations. This Persian version of the scale was then translated back into English by two native English speakers who were Iranian without medical backgrounds. These translators were blind to the original English version. Experts in scale construction, a health psychologist, nurse, neurosurgeon, general practitioner, the scale translators, and the project manager reviewed all versions of the questionnaire and consolidated them into a preliminary final version. This version was then pretested in a sample of 32 persons with SCI (21 males and 11 females). All subjects completed the questionnaire and were asked to comment on the items, response options, and instructions for completion. Based on these comments, changes were made and the final Persian version of the SCL CSQ was then administered to 220 Iranian persons with SCI.

Statistical analysis

Reliability of the SCL CSQ-I was determined using internal consistency and test–retest statistics. Cronbach alpha coefficients over 0.70 are considered satisfactory internal consistency. Test–retest reliability was determined using the Intraclass Correlation Coefficient (ICC) between two administrations of the scale two weeks apart. An ICC of 0.70 or higher is considered acceptable.

Convergent validity of the SCL CSQ-I was evaluated by calculating the Pearson product-moment correlation coefficient between the SCL CSQ-I and CIQ, SCIM III, SF-12, and HADS. Construct validity was examined by the Pearson correlation between each item and its own scale ($r > 0.40$).

The SCL CSQ-I subscales scores across demographic and clinical characteristics were compared using the student *t*-test and one-way analysis of variance (ANOVA).

To evaluate the predictive validity of the SCL CSQ-I, a series of multiple linear regression were conducted with PCS, MCS, CIQ, depression and anxiety as dependent variables.

The factor structure of the SCL CSQ-I was determined using exploratory and confirmatory factor analyses. The sample ($n = 220$) was split randomly into two halves, with exploratory factor analysis (EFA) performed on the first half and confirmatory factor analysis (CFA) conducted on the second half. The Chi-square statistic and student t -test were used to assess differences between the two samples on demographic and clinical characteristics. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to check the factorability of the correlation matrix for the EFA. Principal component analysis (PCA) with varimax rotation was conducted. The factor structure extracted from the EFA was further evaluated using CFA. Model fit was determined based on the recommendations of Byrne [21] using the comparative fit index (CFI ≥ 0.90), normed fit index (NFI ≥ 0.90), root mean square error of approximation (RMSEA ≤ 0.08), goodness of fit index (GFI ≥ 0.90) and adjusted goodness of fit index (AGFI ≥ 0.90). All statistical analyses were conducted using SPSS 18.0 (IBM SPSS Statistics 18.0, IBM Corporation, Somers, NY, USA) and LISREL 8.80.

Results

Demographic and clinical characteristics of participants are summarized in Table 1. Average age of participants was 58 years currently and 28 years at injury, and 74% were male. The most frequent cause of the SCI was car accident. Approximately, 35% had to retire from work due to the injury. The SCL CSQ-I was completed

Table 1
Sample characteristics of persons with SCI ($n = 220$).

Characteristic	Mean (SD)/N (%)
Age	58.18 (10.32)
Age at injury (years)	28.26 (9.16)
Time since injury (months)	50.96 (35.05)
Gender	
Male	164 (74.5%)
Female	56 (25.5%)
Living Situation	
Urban	157 (71.4%)
Rural	63 (28.6%)
Marital status	
Single	78 (35.5%)
Married	114 (51.8%)
Widowed/divorced/separated	28 (12.7%)
Education	
No school	9 (4.1%)
Primary school	80 (36.3%)
Secondary school	79 (35.9%)
College school or above	52 (23.6%)
Work status	
Retired	88 (40.0%)
Employed	44 (20.0%)
Unemployed	88 (40.0%)
Type of lesion	
Complete paraplegia	84 (38.2%)
Incomplete paraplegia	56 (25.4%)
Complete tetraplegia	33 (15.0%)
Incomplete tetraplegia	47 (21.4%)
Lesion level	
Cervical	66 (30.0%)
Thoracic	102 (46.4%)
Lumbar-sacral	52 (23.6%)
Aetiology of SCI	
Traumatic	153 (69.5%)
Non-traumatic	67 (30.5%)

Table 2

Mean (SD) score, internal consistency and test retest reliability of the SCL CSQ-I ($n = 220$).

	M	SD	ICC (95% CI)	Cronbach's alpha
Acceptance	3.23	0.95	0.841 (0.785–0.883)	0.815
Fighting spirit	2.31	0.69	0.736 (0.94–0.961)	0.682
Social reliance	3.43	0.81	0.885 (0.811–0.930)	0.878
PCS	43.39	19.33		
MCS	61.51	21.21		
Depression	7.87	4.86		
Anxiety	8.81	3.54		
SCIM II	51.62	17.45		
CIQ	19.28	6.59		

M, mean; SD, standard deviation; CI, confidence interval

within 3 min on average, and most participants found the questionnaire easy to understand.

Internal consistency and test–retest reliability of the SCL CSQ-I are displayed in Table 2. SCL CSQ-I subscales had a Cronbach $\alpha \geq 0.70$, with the exception of the fighting spirit subscale. The ICCs for two-week test–retest reliability were all above 0.70.

The assessment of convergent validity indicated significant positive correlations between the SCL CSQ-I subscales and PCS and MCS (r 's ranging from 0.212 to 0.392, $p < 0.01$), and negative correlations with the social reliance subscale (r 's ranging from -0.238 to -0.252 , $p < 0.01$). Anxiety and depression were correlated negatively with SCL CSQ-I subscales (r 's ranging from -0.301 to -0.438). However, higher social reliance scores correlated positively with depression and anxiety (r 's ranging from 0.231 to 0.296, $p < 0.01$). Higher scores on physical functioning, as assessed using SCIM III, were positively correlated with the SCL CSQ-I subscales of Acceptance and Fighting spirit (r 's ranging from 0.193 to 0.327, $p < 0.01$), and were significantly and inversely correlated with the social reliance subscale (r 's ranging from -0.158 to -0.246 , $p < 0.01$). Higher social participation was correlated with higher acceptance ($r = 0.289$, $p < 0.01$), higher fighting spirit ($r = 0.326$, $p < 0.01$), and lower social reliance ($r = -0.272$, $p < 0.01$).

Each item within a hypothesized dimension was significantly correlated to the total score for that dimension (using a criterion of $r > 0.30$).

The relationship between the SCL CSQ-I subscales and psychological outcomes were assessed using multiple linear regression. Fighting spirit scores, SCIM scores, and age predicted participants' overall physical health status (PCS) on the SF-12 (Table 3). When MCS was the dependent variable, acceptance, social reliance, and cause of lesion accounted for 49% of variance in mental health.

As indicated in Table 4, SCL CSQ-I subscale scores did not differ by gender. However, there were significant differences in terms of clinical and socio-demographic characteristics. Higher acceptance scores were significantly higher among persons living in urban areas and those who were married, had a college education, were employed, had a traumatic injury, and if a longer time had elapsed since the injury. The results were similar for fighting spirit and social reliance subscales.

Using principal components EFA with varimax rotation, three factors with eigenvalues ≥ 1 were extracted (Table 5). The KMO measures 0.84 and Bartlett's Test of Sphericity was significant ($p < 0.0001$), indicating good factorability of the data. All three factors aggregately explained 61% of variance in total variation of the SCL CSQ-I. No items cross-loaded over more than one factor.

These extracted factors from the EFA were further examined using CFA. The CFA goodness-of-fit measures showed that the three-factor solution was adequate ($\chi^2 = 112.36$; $df = 51$, GFI = 0.95, CFI = 0.98, NFI = 0.96, AGFI = 0.98, RMSEA = 0.056). All

Table 3Regression analyses with the SCL CSQ-I subscales as dependent variables ($n=220$).

	R^2	Independent variables	β	t -Value	p -Value	95% Confidence interval	
						Lower	Upper
PCS	0.32	Fighting Spirit	0.20	2.27	0.007	0.022	0.14
		Age	-0.29	-3.68	0.001	-0.25	-0.07
		SCIM	0.23	2.28	0.02	0.03	0.48
MCS	0.49	Acceptance	0.22	3.53	0.001	2.18	4.74
		Social reliance	-0.25	-3.85	0.0008	-0.23	-0.07
		Cause of lesion	-0.40	-7.10	0.0001	-0.45	-0.25
CIQ	0.38	Acceptance	0.42	3.94	0.0004	0.23	0.72
		Fighting Spirit	0.24	2.46	0.016	0.04	0.37
		Social reliance	-0.31	-3.01	0.004	-0.38	-0.07
		Aetiology of SCI	0.21	2.17	0.03	0.79	2.01
Anxiety	0.54	Acceptance	-0.33	-3.68	0.0002	-1.13	-0.34
		Fighting Spirit	-0.32	-3.82	0.0006	0.1.20	-0.38
		Social reliance	0.63	6.86	0.0001	1.13	2.06
		Gender	0.23	2.89	0.005	0.174	0.94
Depression	0.42	Fighting Spirit	-0.28	-3.62	0.0001	-1.98	-0.58
		Social reliance	0.25	3.12	0.002	0.42	1.86
		Time since injury	-0.19	-2.51	0.01	-1.68	-0.20

 β Standardized Beta coefficient.

12 items of the SCL CSQ-I loaded significantly on their principal subscales, with factor loadings ranging from 0.30 to 0.86.

Discussion

The current study was designed to validate a measure of coping strategies (SCL CSQ-I) in Iranians with spinal cord lesion. A standard procedure was used to translate the English version into the Persian version. The Iranian version of the SCL CSQ

demonstrated acceptable internal consistency, test retest reliability, and both convergent and predictive validity. We also confirmed the three-factor structure of the SCL CSQ-I.

Cultural adaptation of the scale gave rise to several issues. The first issue concerned item 6, "What I have lost physically has been made-up in so many other ways." To improve understanding of the term "making up," we used a Persian word meaning "to compensate". Also, in the item "I refuse to let the injury rule my life", the phrase "rule my life" may not have been understood by

Table 4Comparisons between socio-demographic and clinical characteristics of persons with SCI in terms of coping strategies ($n=220$).

	Acceptance Mean (SD)	p value	Fighting spirit Mean (SD)	p value	Social reliance	p value
Sex		0.48		0.65		0.45
Male	3.45 (0.87)		2.26 (0.61)		3.37 (1.09)	
Female	2.61 (0.76)		2.54 (0.97)		3.66 (1.10)	
Living Situation		0.004		0.002		0.001
Urban	3.65 (0.70)		2.78 (0.65)		3.70 (0.70)	
Rural	3.27 (0.75)		2.17 (0.80)		3.42 (0.77)	
Marital status		0.006		0.004		0.001
Single	2.76 (0.43)		1.06 (0.22)		2.21 (0.88)	
Married	3.29 (0.71)		2.49 (0.72)		3.12 (1.02)	
Widowed/divorced/separated	2.40 (0.76)		1.71(0.51)		2.14 (0.83)	
Education		0.0001		0.008		0.002
No school	2.50 (0.95)		2.17 (1.22)		2.63 (0.66)	
Primary school	2.66 (0.68)		2.07 (1.156)		3.46 (1.95)	
Secondary school	2.92 (1.07)		2.68 (1.16)		3.10 (1.06)	
College school or above	3.62 (0.78)		3.11 (1.19)		2.04 (0.88)	
Work status		0.001		0.004		0.0001
Retired	3.23 (1.19)		1.60 (0.70)		2.64 (0.95)	
Employed	3.83 (1.48)		2.92 (1.33)		3.83 (1.47)	
Unemployed	2.98 (1.58)		2.01 (0.86)		2.57 (1.69)	
Type of lesion		0.12		0.31		0.19
Complete paraplegia	3.72 (1.10)		2.90 (0.69)		3.66 (1.27)	
Incomplete paraplegia	3.41 (0.97)		2.45 (1.06)		3.40 (1.67)	
Complete tetraplegia	3.58 (1.41)		3.01 (1.27)		3.80 (1.75)	
Incomplete tetraplegia	3.02 (1.30)		2.88 (1.01)		3.69 (1.36)	
Aetiology of SCI		0.001		0.0008		0.0021
Traumatic	3.71 (1.49)		2.53 (1.24)		2.96 (1.58)	
Non-traumatic	3.08 (1.27)		1.94 (0.80)		3.62 (1.71)	
Time since injury (months)		0.02		0.18		0.10
1–10	2.35 (0.79)		1.70 (0.82)		2.94 (0.79)	
11–20	2.51 (0.82)		1.68 (0.96)		3.04 (1.29)	
21–30	2.71 (0.96)		1.93 (0.93)		3.59 (1.79)	
31–40	3.14 (0.74)		2.13 (0.91)		3.28 (1.25)	
>40	3.22 (1.19)		2.43 (1.12)		3.40 (1.80)	

Table 5
Results from exploratory factor analysis ($n = 110$).

	Component 1 Acceptance	Component 2 Social reliance	Component 3 Fighting
Item 1	0.766	0.160	0.130
Item 2	0.779	0.108	0.016
Item 3	0.177	0.161	0.606
Item 4	0.192	0.857	0.186
Item 5	0.178	0.200	0.643
Item 6	0.762	0.276	0.186
Item 7	0.149	0.095	0.725
Item 8	0.148	0.880	0.180
Item 9	0.304	0.830	0.088
Item 10	0.077	0.115	0.680
Item 11	0.779	0.164	0.184
Item 12	0.03	0.015	0.538
Eigenvalues	4.38	1.55	1.33
% of variance	21.88	20.21	18.48
Total variance		60.58%	

The highest factor loading for each item is in bold.

Iranian patients. Therefore, we changed this sentence by replacing the word of “rule” with “determine” (i.e., determine the quality of my life).

The Persian version of the SCL CSQ demonstrated internal consistency similar to the original and Spanish versions [6,8,22,23]. However, the fighting spirit subscale did not meet the minimum criteria for internal consistency. One reason might be that although the scale has 4 items (more than the social reliance subscale), its items may have greater variability and may need to further refinement for this population.

The reproducibility of responses to the SCL CSQ-I over a two-week interval was supported by high ICCs. These results are similar to those reported by Paker et al. [7]. The 2-week interval was chosen to avoid recall bias and unwanted clinical change. The SCL CSQ-I is considered a clinically heterogeneous scale due to its diverse domains. However, the fighting spirit dimension demonstrated lower test–retest reliability than the two other domains.

Not surprisingly, participants with better physical functioning used more coping strategies. Social reliance was understandably correlated with poorer physical functioning. Previous studies have demonstrated that persons with SCI who considered problems as a threat and loss are more likely to use passive coping strategies [24]. Patients who find their situation as stressful and threatening might underestimate their skills and resources to cope with their condition. Therefore, these individuals may be more likely to request for others' help and may be more depressed and anxious as well. We found a positive correlation between scores on the social reliance subscale and both depression and anxiety. As Lazarus and Folkman have observed [25], it is likely that persons with SCI who view their situations as ordered, predictable and manageable may be more likely to have sense of coherence and therefore use active coping strategies such as acceptance and fighting spirit. According to Antonovsky, sense of coherence is a perspective that involves pervasive, permanent and dynamic feelings of confidence that originate from internal or external environments [26]. Thus, social reliance may serve as an external resource to improve a sense of coherence and promote the use of active coping. We found that those who used acceptance and fighting spirit as coping strategies scored lower on depression and anxiety and higher on quality of life, the opposite of what we found for social reliance. These results are comparable to those reported by others using this scale [8,27,28].

We also found that injury characteristics were not well-correlated with the process of adaptation. Surprisingly, however, persons with non-traumatic SCI were more likely to use passive coping strategies than those with traumatic SCI. More research is needed before concluding that injury characteristics have no role in choice of coping strategy, since conventional wisdom and

clinical experience would suggest otherwise. However, conventional wisdom and clinical experience may not apply to all situations. Therefore, more research is needed on the different types of dependence (physical, psychological, and social). The cultural context, in fact, may influence the type of dependency with the greatest influence. For example, in Mid-eastern cultures where immediate and extended families may be particularly important, social dependence may be more influential, whereas in Western cultures where individualism is prevalent, there may be greater emphasis on physical or psychological independence.

Our findings also indicated that time from injury may play a role in adjustment to SCI. We found that when time since injury was longer, depression was less common and acceptance of the condition more likely. Thus, as time elapses from the initial injury, adjustment may improve. This is consistent with the findings of Taylor et al. who found that time since injury was an important factor in the types of coping strategies used by people with SCI [29].

The construct validity of the Persian version of the SCL CSQ-I here was indicated by acceptable correlations between each item and its subscale, supporting the hypothesized structure of the SCL CSQ-I. In addition, the factor structure was further investigated using EFA and CFA, indicating a three-factor model with an acceptable fit. These findings are consistent with the factor structure of the SCL CSQ-I reported during its initial development [6]. CFA is a more proper method for testing the underlying factor structure. To our knowledge, however, CFA of the scale has been examined in only one prior study, which also reported a three-factor structure [8] as in the original study [6,8].

The present study has limitations that may affect the generalizability and interpretation of results. The study design was cross-sectional and did not examine changes in coping with SCI over time, not allowing us to determine whether or not the SCL CSQ-I is sensitive to changes during the rehabilitation process. The findings here suggest there may be similarities (and differences) between the ways people with SCI cope with spinal cord injuries in different countries, although further research is needed to substantiate this claim. Future studies (both cross-sectional and longitudinal) in different cultural contexts are needed in patients with SCI to determine the full range of coping strategies for this condition and determine which are more or less successful. Another limitation of this study is that we did not limit the duration of disability in our inclusion criteria. We included all eligible persons with SCI of at least 3 month in duration. Coping strategies in early stages of the disorder, however, may differ from those in later stages and may also vary in their effectiveness. However, since SCI is not a temporary condition, some coping strategies may be similar regardless of the time since injury.

Although the present study included a large number of persons with SCI, they may not have been representative of all Iranians with SCI since this was not a random sample recruited from all regions of Iran. The results reported here, then, should be interpreted with caution. However, this is the first study to examine the SCL CSQ in a Middle-Eastern population with SCI.

In conclusion, we found that the Persian/Farsi version of the SCL CSQ is a reliable and valid tool for measuring coping strategies in persons with SCI in Iran.

Conflict of interest

The authors declare no conflict of interest

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